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FORMAT

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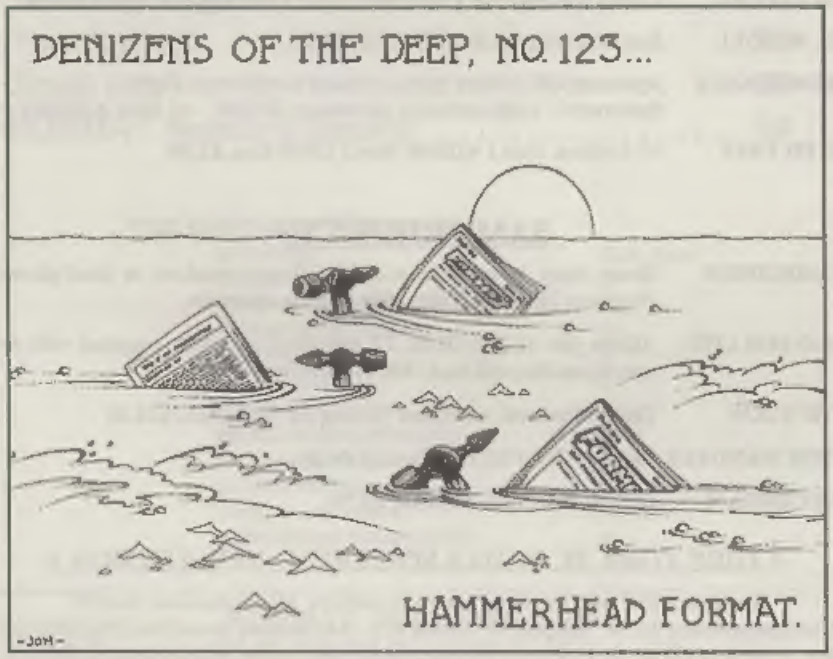

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NEWS ON 4

BETASOFT EXPANSION

Birmingham based SAM & Spectrum software company Betasoft expanded their staff on the 6th January. The new member is said to be a very noisy addition who is causing some disruption to office routine.

Marcus Alexander tipped the scales at 9lbd 9ozs (big boy!) and is Andy and Celia's first child.

Our congratulations go to all involved and we hope young Marcus soon learns to use a computer and becomes a productive member of the team.

ZX AMIGA MEETS GDOS!

SPECULATOR, the fast Spectrum emulator for the Amiga, unveiled at the Gloucester show last November, is now seeking beta-testers and should soon be released through Amiga P.D. suppliers.

You need an A1200 (68020) or better to emulate the Z80 at reasonable speed - the old A500 and A600 are rather slow.

A full review should appear next month but in the meantime anyone who wants the latest version of Amiga SPECULATOR should send a blank disc and return postage to the author, William James, at 54 Victor Road, Newtown, Colchester, Essex CO1 2LX.

NEW DRIVES FOR SAM

When the SAM Coupé was designed Citizen UK were pushing their 3½" slim-line drives for all they were worth. "Best thing since sliced bread", "Will soon become the industry standard" were just two of the claims made for the drives.

Soon after SAMCO took over SAM production Citizen withdrew most of the UK stock of slim-lines and shipped them back to the Far East. That started the drive shortage which plagued SAMCO and has plagued West Coast Computers since they took over.

Well, now there is light at the end of the tunnel. New machines now being shipped are being fitted with a more standard 1" high drive which allows WCC to buy drives from a variety of sources. It does mean that you can no longer just buy a drive and slot it in as SAM users have done with the old drives, the machine has to be opened up to fit the new drive. However, West Coast will be offering a free fitting service.

More details as soon as we have them. In the meantime give us a ring on the Hot Line number if you want a SAM drive and we will tell you what to do.

DISCIPLE ROM DISASSEMBLY

DISCiPLEs may be getting a little long in the tooth now but those who use them are a dedicated bunch, but there are few who can match the dedication of Rudy Blesma who has painstakingly disassembled the DISCiPLE's ROM and DOS to create a 200+ page A5 book.

Priced at *f*35, that is Dutch Florins by the way, which works out at about £14 including P&P, it is available from Rudy Blesma, Betuwe 18, NL-9405 JJ Assen, The Netherlands. [If there is enough interest Format may get stocks.]

Credits: Simon Goodwin.

URGENT we need your news. Anything you think other people should know about. Each item printed earns the contributor 3 months extra subscription (*please claim when next renewing*).

The Editor Speaks

I must admit I've been playing games again. If you remember I confessed last month that I had spent a lot of the Christmas holiday engrossed in Revelation's *Legend of Eshan*, well this month it has been *Lemmings* from FRED Publishing. I had never played the game on other formats - although I have met several addicts in the past - so I came to the game without knowing much about it. Well, Jenny has now locked my copy away and will only allow me to have it back once I've finished this month's ***FORMAT*** and got the Associate mail-shot out of the way. Still, withdrawal symptoms are not too bad, the twitching is calming down now - and in only a few more days I can have the disc back.

Anyway. Down to some real business. The 2nd Gloucester Show. Planned for the Saturday 30th April at the Quedgeley Village Hall, the doors will open at 10:30am with the show closing at 4:30pm, in other words - the same as last time. Tickets will also cost the same as last time, £2 per person or a family ticket (2 adults & 2 kids) for £5. But this time we are offering advanced tickets a little cheaper at £1.25 each (£3.50 family). And, in addition, if you purchased a ticket for the November show you can claim an extra discount of 25p per ticket - we have your names on file and we are doing this to reward your loyalty. To buy advanced tickets just send your payment, together with an SAE which we will send your tickets in, to our usual address. Tickets will be sent out about two weeks before the show.

The first Gloucester Gathering in November was very well attended (see the report by John Wase in this issue. Well over 250 people through the door, and it already looks like this one will be even larger, so book your tickets as quickly as possible.

One idea I raised last month was for people to offer to share transport, the first such offer is in the letters page this month and I hope we will get more. If you need bus time tables to get from the centre of Gloucester to the show the just ask when you order your tickets.

Anyone who would like to bring along some equipment and give a few demos or informal chats will be very welcome but please phone me as soon as possible because space is limited.

Adrian Parker, of Blue Alpha (and Hardware Design Course) fame, as asked for people to write to him if they would be interested in a new hardware development kit. I'm not sure what he intends at the moment but if you send him an SAE he will send you all the details.

And now a word of warning. Our printing originals for the issues of volumes 1 and 2 of ***FORMAT*** are now reaching the end of their life. I have therefore decided to take the sad step and declare both volumes out of print from the end of May this year. So, if you have not already purchased volume 1 and/or volume 2 then now is the time to get your orders off to us. Both volumes contain lots of invaluable information for DISCiPLE/PLUS D owners and they are well worth having if you are still using a Spectrum.

Until next month.

Bob Brenchley, Editor.

SHORT • SPOT

YOUR HINTS, TIPS AND PROGRAMMING IDEAS

Edited By:- John Wase.

You know, the older one gets, the more the days seem to flip by. I only finished the last Short Spot a couple of days ago, and now it's time for the next... Or so it seems.

First, let's have something from Ettrick Thomson. Like the weather last week, Ettrick's been quiet for a while. And like the weather, which tonight is brewing up for snow, he's blown a storm at me. The first yorker he's bowled, and I quote, "is the 2-line program from John Ewing, who says that "he has not really been following the correspondence". Neither has John Wase! For these lines are essentially those of Lee Willis' QUIRK, (Sep '93) with my (Ettrick's) comments in Oct '93. John E talks about a 'Well known bug'; not all that well known, it seems. I wouldn't call it a bug, because it is the result of a deliberate decision by the Spectrum programmer; the odd effects occur only when DRAW x,y,z is used in a way that is different from what the programmer was catering for."

Oh, dear. I will consider my wrists well and truly slapped; my apologies, for indeed I hadn't noticed.

Ettrick also notices that the new-look Short Spot uses different typefaces for different purposes, and asks about old-style numerals. Well, Ettrick, you can still get them; most of the Monotype 'old style' (and some of the moderns like Eric Gill's 'Perpetua') sport both in a full fount; it's only these wretched synthetic scaled fonts that don't bother. But I still don't know if you can get it for the new type in ***FORMAT***. [Don't worry readers - I'm not sure what they are talking about either. ***Ed.***] Probably not for the face which has each letter of the same width, so that one can write programs in it. So we're still stuck with the 'ell' and 'one' problem, aren't we. Makes life interesting, anyway.

There's lots of stuff from Ettrick on his disc, but I do like to spread the load a bit. So let's end his contribution this month with a very appropriate program. After all, it's nearly 10 o'clock on a Friday night, and I'm getting up again at 4.00; we have a 5.00 o'clock start for Wales early in the morning, so it's bound to. To What?

Well, this is a 'snowflake' program for SAM. It tries to give an impression of one type of snow crystal with its 6-fold symmetry. It uses a recursive procedure, and started life as a Spectrum BetaBasic program, where it used the range 0-175 for the pixel y-coordinate. SAM normally has the range 0-173, but the 'LET yos=-2' of LINE 10 converts to 0-175.

```
  5 REM Snowflake
  7 REM Ettrick Thomson
 10 LET yos=-2
 20 LET r=1/2,s=r+1/6,t=(SQR 3
    )/6
 30 INPUT #2;"depth"'"(>0):"n
 40 sno n,128,88,228,88
 50 sno n,128,88,178,175
 60 sno n,128,88,78,175
 70 sno n,128,88,28,88
 80 sno n,128,88,78,1
 90 sno n,128,88,178,1
100 STOP
```

```
200 DEF PROC sno a,x,y,u,v
210 LOCAL a,b,c,d,e,f,p,q
220 LET p=u-x,q=v-y
230 LET a=x+r*p,b=y+r*q
240 LET c=x+s*p-t*q,d=y+s*q+t*
    p
250 LET e=c+2*t*q,f=d-2*t*p
260 IF n=0
270 PLOT x,y: DRAW TO u,v
280 PLOT c,d: DRAW TO a,b: DRA
    W TO e,f
290 ELSE
300 sno n-1,x,y,a,b
310 sno n-1,a,b,c,d
320 sno n-1,a,b,e,f
330 sno n-1,a,b,u,v
340 END IF
350 END PROC
```

Now, you Spectrum/PLUS D users, you thought I'd forgotten you, didn't you. Well, here's a little routine from Miles Kinloch of Edinburgh (who sent me two letters this month), which gives us the real goods. I'm sure you're all aware of the difficulty the PLUS D has in using opentype files, Well, Miles has a solution. He writes that the facility to use stream 3 to write to a disc file is a facility which Interface 1 made much use of. The problem lies not in actually opening the file, but in closing it. He has therefore written a patch for the DOS which rectifies this, allowing stream 3 to be closed in the same way as streams 4-15, so that opentype files on it become feasible. To set stream 3 for the printer again, use OPEN #3,"p" after closing the disc file.

The modified system file can afterwards be saved from the PLUS D RAM in the usual way.

Note that the routine works only with G+DOS 2a, as there is no spare RAM with Betados. It is, however, compatible with Steve Nutting's Toolkit system files, MGT's Pick-POKE-It, the snapshot button/key 0 patch, and Carol Brooksbank's 'On A New Key' routine. (12750-12780 is used for the patch).

```
10 REM     CLOSE STREAM 3
20 REM     G+DOS 2a PATCH
30 REM      By M.Kinloch
40
50 CLS : PRINT "PRESS ANY KEY
   TO MODIFY G+DOS 2a": PAUSE
   0
60 POKE @3695,205: POKE @3696,
   12750
70 LET c=0: FOR a=4558 TO 4588
   : READ d: POKE @a,d: LET c=
   c+d: NEXT a
80 DATA 235,33,228,163,237,90,
   32,18
90 DATA 98,107,78,35,70,33,239
   ,255
100 DATA 9,48,7,1,0,0,215,252
110 DATA 22,201,235,215,235,22,
    201
120 IF c<>3614 THEN CLS : PRINT
    "ERROR IN DATA!": STOP
130 NEW
```

Miles' second note concerns a couple of further bugs in G+DOS which he's discovered - and fixed! The first one concerns the OPEN # command, and has to do with synthax checking. What happens is that if you omit the 'IN' or 'OUT' command at the end of an OPEN # command, you can't then have another statement after it in the same line. For instance, the following line looks perfectly OK, but can't be entered:-

```
10 OPEN #4;d1"anyfile": GOTO 1
   00
```

This bug affects both G+DOS and BetaDOS. The following program corrects it in GDOS...

```
10 REM   G+DOS 2a BUG FIX
20 REM Fixes OPEN # command st
   atement end
30 FOR a=3189 TO 3200: READ d:
    POKE @a,d: NEXT a
40 DATA 191,40,9,254,223,40,5,
   0,0,0,24,4
50 PRINT "Press any key to re-
   save G+DOS": PAUSE 0
60 SAVE d1"+SYS 2a"CODE 8192,6
   656
```

A different listing is needed to put it right in BetaDOS, as is can't be saved directly from the PLUS D RAM. This

routine also contains yet another bugfix, again for BetaDOS only - this time for the SAVE @ command. Here, the problem is in the special routine which spins the drive motor for about a second to ensure it is up to speed before the actual sector is written. As written, the routine takes no account of the drive number, and merely tries to spin the last drive used, whichever one that happened to be. Fortunately, the drive is changed to the correct one before the sector is written, so fortunately there's never any danger of saving to the wrong drive, but the chance of corrupting the sector is always there.

As long as there are discs in both drives, the problem will never be noticed, but if you try the following, it will show up. First, put a disc in drive 1. Now type CAT 1. When the CAT has finished, remove the disc from drive 1, and enter the command SAVE @2,1,1,30000 (make sure the disc in drive 2 is an unimportant one)! The only way BetaDOS will go on to save the sector on drive 2 is if you put a disc in drive 1 first.

Here's a listing for BetaDOS which will cure both these bugs.

```
10 REM   BETADOS BUG FIXES
20 CLEAR 4e4: LOAD d1"+sys Bet
   a"CODE 40960
30 FOR a=44149 TO 44160: READ
   d: POKE a,d: NEXT a: DATA 1
   91,40,9,254,223,40,5,205,23
   6,54,32,4: POKE 46828,0: PO
   KE 46831,201: REM Fixes OPE
   N # command statement end
40 FOR a=41512 TO 41516: READ
   d: POKE a,d: NEXT a: DATA 2
   11,239,195,246,55: POKE 457
   49,40: POKE 45750,34: REM F
   ixes 'SAVE @' command
50 PRINT "Press any key to re-
   save Betados": PAUSE 0
60 SAVE d1"+sys Beta"CODE 4096
   0,6850: STOP
```

Finally, with BetaDOS, there is a problem with the command code 'HWSAD', that is RST 8, DEFB 69, which saves a sector to disc. All the command codes are supposed to return with the carry flag set to signal an error, and with carry reset when there's no error. 'HWSAD' always returns with it set when you use BetaDOS (though it works OK under G+DOS), error or no error. And (thank you Miles for the last note), it's not the only BetaDOS routine to suffer in this way. 'HRSAD' (RST 8 DEFB 68), which reads a sector from disc also suffers from the same problem with the carry flag. In fact, it's in the same section of code in a routine common to both command codes. Again, this is a bug which has crept in with that new routine which spins the disc to get it up to speed. Miles writes that he knows how to fix it, but is unable to cure it as, alas, every last byte has already been used, and there is not spare PLUS D RAM anywhere to play with. At least 10 spare bytes is needed, and it's most frustrating; there just is no room. It affects only machine code programs, but some quite well known ones can suffer. For instance, Hackers' workbench (SD Software) is directly affected by this. It therefore won't run under BetaDOS, though it works fine with G+DOS 2a, as well as with the DISCiPLE. As a consolation, this bug is not going to present any problems in Basic, so Basic programmers need have nothing to worry about. Many thanks, Miles, and if anyone knows how to save 10 bytes somewhere in BetaDOS, please let Miles know!

Now on to the Spirograph. I was going to stop putting stuff in on the spirograph last month. This was to be the last piece. As you know, Short Spot has to be edited to fit the space available. What did Bob cut out? You've guessed it.

In addition, I've got a huge pile of letters from Roy Burford of Stourbridge,

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The *SC_MONITOR pro pack* now comes with another Monitor Utility *TurboMON by Simon Owen*, this has similar features to the original SC_MONITOR, but has the ability to run and keep control of machine programs up to an astonishing 1\50 th of Sams speed, this can be quite fun seeing Spectrum (Plus D) and unprotected Sam games run in slow motion, seeing how the the graphics are placed and moved around the screen.
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Desk Top Publisher, organise text and graphics to produce professional Newsletters, Manuals etc. Comes with built in word-processor, output to 9 and enhanced 24 pin printers.

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West Midlands all with indistinguishable post-marks, and which I've stupidly jumbled. Fortunately, Roy mentions in a later letter that if I cannot locate the necessary algorithm, it went something like this:

Algorithm for the LCM of two meshed gears: cancel the common primary factors from the greater-than-one ratio (common fraction), and the remaining numerator is the LCM. For the Spirograph range of wheels and rings it is only necessary to go as fat as primary factor 7. The LCM represents the number of times the smaller wheel must rotate before initially meshing teeth again remesh; in the spirograph, the revolutions of the wheel to bring the pen back to its starting position. Many thanks Roy.

And the bit that was cut out? A new entrant to the Great Spirograph Debate; Frank Evans of Waltham Abbey, Essex. And he and Bob between them have given me a bit of a problem. You see, Frank has done just what I asked for. Let me explain. You must all get fed up with repeats of long programs with only a few lines altered. So Bob and I decided to ask that you only send the alterations for MERGEing. Problem is, in this case it's not terribly clear what has been done. At the risk of offending some, however, we'll do just that and keep it crisp. Frank has devised an algorithm for the Lowest Common Multiple. He has found that the number of points in a star is equal to the number of teeth in the chosen ring divided by the Highest Common Factor of the ring and wheel. This can be demonstrated by adding the following line of code, where s=the Highest Common Factor:-

```
275 PRINT AT 0,0; "POINTS= "; r
    /s
```

Frank also comments that the FOR/NEXT loop E is useful for adding colour changes at each pass. In addition, he has found that the size of the wheels is not limited by those given. Great stuff, though do remember that what may work on one Spectrum may not quite work on another.

All you've got to do is to type this lot in, SAVE it (just in case) as LCM, then MERGE 'LCM' with the original 'SpiroG' featured in last September's ***FORMAT***. Here it is:-

```
  5 POKE SVAR 50,1
 12 LET sc=80
 39 LET r1=VAL w$:low: IF c$="
    0" THEN LET r1=-r1,sc=40
 43 LET F=SC*(1-E)/(R-D)
 45 FOR t=0 TO 2*PI*lcm/r STEP
    0.05
200 DEF PROC low: REM lowest c
    ommon multiple
210 LET s=ABS r,s1=ABS r1
220 LET s3=s1 DIV s
230 LET s4=s1-(s*s3)
240 LET s1=s,s=s4
250 IF s4=0 THEN GOTO 270
260 GOTO 220
270 LET LCM=S1*(ABS R/S1)*(ABS
    R1/S1)
280 END PROC
```

As a collection of limericks, well they're awfull As a SAM advertising stunt, it's great. Bob will love you: I'm not so sure!

And that's all for this month. Please keep all your snippets coming to me; without them I can't put a column together. Please send them to:-

John Wase,
Green Leys Cottage,
Bishampton,
Pershore,
Worcs,
WR10 2LX.

See you next month.

[By the way, if you are sending in something that you have come across in an old magazine like Popular or ZX then please quote the original author's name and if possible the mag's title and issue date. Thanks very much.]

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Show Report

A Personal Look At Gloucester's First Show Last November.

By:- John Wase.

The Spectrum is dead; long live the Spectrum. Or so someone said. And they were right, too, if the Show at Quedgeley last November was anything to go by. The place was full; full of enthusiasts and full of stalls. There were people from Coventry and Chichester, just like the advert for a certain Building Society on the telly. They'd come much farther than that, though. One lot had made the journey from Cambridge, another lot all the way from Truro. Indeed, there was a pretty good contingent of folks from as far afield as London and the South of England, South Wales and the Midlands; understandably those further North were not as well represented. Hundreds of enthusiasts made their way through the doors during the day. Was their journey worth it?

There were a number of things about Quedgeley that made it unique. In the first place, there was the friendliness of everyone, just like a huge sort of club. Everyone was pleasant; it was clearly a major social occasion. And that made it unusual, different from the run-of-the-mill fairs; the big impersonal shows in London, with their commercial push-and-shovery.

The second was that there one could see the whole history of the Spectrum and SAM before one. If you read the article I sent to Micro Computer Mart, you will see that there were all the characters - Simon Goodwin, Bruce Gordon, Bob Brenchley, Andy Wright, David Wornham, Dave and Jean Tonks, Brian Gaff, Nev Young, Carol and Don Brooksbank, Adrian Parker, Bill Richardson, Colin McDonald, Jack Gibbons and others too many to list. More: they were willing to talk, to help, to advise. Indeed, there was a mixture of stands there, for some, like ***FORMAT*** and SD Software clearly had stuff to sell, but others, like Carol, were merely there to demonstrate and advise.

I said the whole history was there. I saw very early Spectrums and Microdrives, still working well, with fascinated crowds round the monitors.

Carol Brooksbank - in one of her quieter moments. (The photographer still had to fight his way to the front to take this picture)

The old Opus Discovery disc drive (I remember it well, for I used to have a Discovery Column in good ol' "ZX Computing") was there in force; I counted four of them. There were rubber-keyed beer mats, and Clive's answer to the BEEB, the Spectrum Plus, complete with its wobbly shake-off keys. There was even a black 128, with steak-toaster end (but never a key-pad). There were lots of grey Amstrad/Sinclair +2s, clearly one of the machines of choice for the discerning. Lots of PLUS D drives. A lone DISCiPLE, a black +2a and a +3.

Then there were the SAMbits. West Coast were selling whole SAMs, and there were lots of other hardware and software stalls for Sinclair and SAM owners. There was new, original software and old re-issued software. There were the clubs, the bits and bobs. The SAMs and the displays. There was even a bring and buy stall which seemed to do a roaring trade.. And there were enthusiasts and their audiences. They were all there, somewhere. The whole place seemed run by enthusiasts, who were helping those with difficulties, demonstrating enthusiastically, chatting loudly; everyone seemed to be good-timing and jollying.

Finally, there was the goodwill. It wasn't just the stallholders. They were particularly pleasant, I know, but so was everyone. It was a nice do, a super do, from the snack bar to the displays. It wasn't just that there were all the specialised things that one needs to keep Speccies and SAMs on the road. It wasn't that there were lots of people there. I mean, all these things are true. But I left, much later than I had intended, with the feeling of having had a wonderful day. They say there's another in late Spring: well, I just can't wait.

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MACHINE CODE WITHOUT THE TEARS

Part 24.

By:- Carol Brookesbank.

There are some registers to which I have not previously introduced you. You will not use them nearly as much as you use the ones you are already familiar with, but you should know what they are and what they do.

The IX Register - the IndeX register.

This is a special two byte register, but it does not split into two separate single registers as HL, BC, DE and AF do. (Well, officially it does not because the instructions which do the equivalent of LD X,n and so on are not documented. In fact, they do exist and most Z80 processors will perform them - including Spectrum's and Sam's. Your assembler handbook may tell you that the assembler can handle the undocumented codes, and how to enter them. But my advice is, don't bother. Many assemblers will not handle them, there is no guarantee that they will be performed by every Z80 chip you may meet in the future, and you have quite enough to worry about with the officially documented codes.)

So, IX is always handled as a double register. You can load an address into IX, usually the start of a table or an array. The usual form for peek/poke instructions is: LD (IX+d),n. This means add the displacement d to the address held in IX, and poke the number n into that address. INC (IX+d), DEC (IX+d), LD A,(IX+d), LD (IX+d),B, RLC (IX+d) and so on will all work too.

Generally speaking, the instructions available with HL are available with IX. You can LD IX,n DEC IX, INC IX, PUSH IX, POP IX and so on, but when you are using the equivalents of (HL) you add the displacement which allows you to index into the table. The only exception to that rule is that the JP instruction is JP (IX) - not JP (IX+d). But that is because JP (HL) is a rather misleading instruction. It is not a peek instruction at all, but simply means jump to the address in HL, so JP (IX) means jump to the address in IX.

And the only exceptions to the general rule that HL instructions are available with IX, are that there are no equivalents to EX DE,HL ADC HL,rr and SBC HL,rr for IX.

So how would you use this register? Well, suppose you had a table of graphics positions. Let's say one of the graphics was an owl. The first two bytes in our table would be the address of the owl's character pattern bytes, the third the number of bytes required to draw the owl, and the fourth and fifth bytes would be the x,y co-ordinates of the owl's position on screen.

So, let us say our owl's bytes were stored at 30000, it was a 72 byte sprite, drawn on screen at 0,150. Our table would look like this.

```
OWLDATA DEFW 30000
        DEFB 72
        DEFB 0
        DEFB 150
```

If we wanted to move the owl 5 pixels to the right,

```
LD IX,OWLDATA
LD A,5
ADD A,(IX+4)
LD (IX+4),A
```

would store the new x co-ordinate. The routine which drew the owl would find the starting position from (IX+4) and (IX+5), the number of bytes to poke into the screen file from (IX+3), and the address of the bytes to copy by something like LD H,(IX+1) LD L,(IX+0).

This can be a very useful register, saving a lot of time and trouble. The alternative to:-

```
LD IX,OWLDATA
LD A,(IX+3)
```

would be something like

```
LD HL,OWLDATA
LD BC,3
ADD HL,BC
LD A,(HL)
```

The IY Register

There is another index register called IY, which works in exactly the same way. The only difficulty is that Basic uses IY, so you need to make sure that, if you are using IY, you put back the number it originally held before you exit to Basic. A simple PUSH IY before you use it and POP IY when you have finished will take care of it. Apart from that, IY is used in exactly the same way as IX. The hi-bytes (I) of IX and IY are quite unconnected.

The SP Register - the Stack Pointer

This is another double register, which holds the address of the last item on the machine stack - the last thing you PUSHed. It cannot be separated into two single registers, even unofficially.

I have talked about the stack as resembling one of those spikes that sit on your desk - onto which you push bits of of paper. In fact, it would have been more accurate to describe it as a spike hanging down from the ceiling. The machine stack is upside down. It grows downwards by 2 bytes every time you PUSH a value. PUSH HL is really shorthand for:-

```
DEC SP
LD (SP),H (except that there is
           no such instruction)
DEC SP
LD (SP),L (except that there is
           no such instruction)
```

So, INC SP INC SP would have the same effect as POP - it would point the stack pointer to the previous PUSHed value, but without preserving the top one in another register as POP would. In fact, if you want to balance the stack without disturbing the contents of any of your registers, that is a handy way to do it.

Incidentally, while we are on the subject of stacks, the FPC stack is the right way up - it really is like a spike on the desk.

On the whole, my advice about manipulating SP is - don't - unless you are very sure you know what you are doing. If you LD SP,nn you will, in practice, start a new stack at the new address - and heaven help you if anything vital was left on the old one - like the address the computer put there, and which it needs to exit to Basic. Also, the bytes immediately below the address in SP will be overwritten by the computer's interrupt routine, so unless DI is operating, don't point SP to a byte above anything important. Fiddling blindly with the Stack Pointer is a guaranteed way of causing a crash.

But, having said that, if you are very careful to leave the stack and stack pointer as you found them before you exit a subroutine or exit to Basic, manipulating the SP can be a useful and quick way of doing things.

LD HL,0; ADD HL,SP will get hold of the current SP address, but PUSH HL will not preserve it if you then change SP! PUSHing the old stack address should be the first operation on the new one. The instructions you can use with SP are:-

```
ADC HL,SP  ADD HL,SP  ADD IX,SP
ADD IY,SP  DEC SP     INC SP
LD SP,HL   LD (nn),SP LD SP,IX
LD SP,(nn) LD SP,IY   LD SP,nn
SBC HL,SP  EX (SP),HL EX (SP),IX
EX (SP),IY
```

If you use EX (SP),HL, you will put the last address PUSHed into HL, and the value of HL onto the stack. Unless you POP that value, the next RET will jump to the address you formerly had in HL. Be sure that is what you intended. EX (SP),HL does not change SP itself.

The PC register - the Program Counter

This is also a double register, but one which you cannot change. There are no instructions for manipulating the program counter. It is the register which the processor updates to know where it has got to, and it always holds the address of the next instruction to perform. Instructions like CALL, RET, RST, JR and JP change it.

CALL, in fact, causes the following sequence, although there are no genuine instructions for any of this:-

```
PUSH PC
LD PC, call address
JP (PC)
```

RET causes:- (again, these are imaginary instructions)

```
POP PC
JP (PC)
```

which jumps to whatever the address on top of the stack was.

Although we cannot change the value of PC directly, it is vital to be aware of what effect the things you do will have on it. The next instruction executed will always be the one pointed to by PC.

We are coming to the end of this series now. I have given you the foundations of machine code, but you need now to move on to look at the work of other programmers. My own machine code skills are fairly limited - I am not in the same league as people like Andy Wright, Steve Nutting and Bruce Gordon. (There is a lot of truth in the old saying "Those who can, do. Those who can't, teach"!).

So, where are you to go from here? The obvious place is into the pages of ***FORMAT***. There are often machine code programs printed, and the back numbers will be a gold mine of useful programs for you to study and type in. Don't just type them in blindly. Try to understand what is happening so that you go on learning.

There are also quite a few useful books around, though I do not know of any Sam-orientated books on machine code. For Sam users, it will often mean adapting what you find in a Spectrum book. Look back over this series to see how we adapted Spectrum routines to work on Sam. Check in the SAM TECHNICAL MANUAL, of which I gave details in part 19, to see where changes are likely. Often the major changes will come because you need to page the screen in, or because the author has used a call to a ROM routine which is different or non-existent on Sam. THE COMPLETE SPECTRUM ROM DISASSEMBLY (again details in part 19) will tell you what was going on at the address called, in case you have to write the routine out yourself. Two of our library routines, DEC.FPC and PX_ADD, were adapted from similar Spectrum ROM routines.

For Spectrum readers, there are a number of books around - and Sam readers can benefit from many of them. This list is a selection of the ones I have myself. If they are out of print (which

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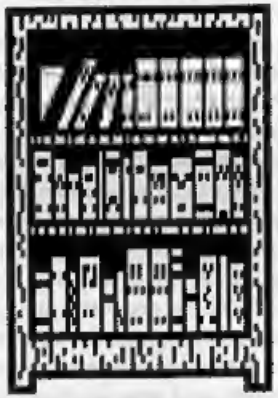

most of them are, your Library should be able to get them for you, or you could try frequenting the stalls at computer fairs. You can often pick these and others like them up at bargain prices, even when they are unobtainable in the High Street bookshops.

Toni BAKER.
Mastering Machine Code On Your ZX Spectrum. (Interface)

This is my Bible - the book from which I learned machine code. A word of warning - almost every routine has a mistake in it, but I found that I learned more by debugging them than I ever could by just copying them.

You cannot simply move on without having grasped what you have been learning if you have to correct the routine before it will work. It is not an intentional teaching method, though. They are printing errors.

Adrian DICKENS. Mark PLUMBLEY. Leycester WHEWELL.
Spectrum Advanced User Guide. (Adder)

Explains exactly what is happening with Basic commands and machine code instructions. A very useful section on the Interface 1 hook codes and how to use them.

William NITSCHKE.
Advanced Z80 Machine Code Programming. (Interface)

Not Spectrum or Sam specific. Assumes you already know most of what you will have learnt from this series. An excellent guide to program planning and structure. Lots of short examples of methods of doing things. An invaluable book when you are writing your own programs.

Joe PRITCHARD.
Spectrum +2 Machine Language For The Absolute Beginner. (Melbourne)

The machine code tutor is quite elementary, but there are excellent chapters about 128K sound and 128K memory paging. Also a first-class chapter on the interrupt modes and vectoring to your own routines on interrupt - something I have not dealt with because it is not really beginners' work. However, it would make a useful next step for you, and I could not explain it any better or more simply than this book does.

William TANG.
Spectrum Machine Language For The Absolute Beginner. (Melbourne)

The first part covers machine code instructions and registers, and makes an excellent place to look up something you can't quite remember. It then devotes about a third of the book to writing a game - with full analysis of what all the routines do. An excellent way of building on what we have studied.

David WEBB.
Advanced Spectrum Machine Language. *and* **Super Charge Your Spectrum.** (both Melbourne)

Two books crammed with short machine code routines for doing all sorts of Spectrum operations. All routines fully explained and with many notes in the listings.

Rodney ZAKS.
Programming The Z80. (Sybex)

Not Spectrum or Sam specific. This is the most important reference tool of all. It analyses in great detail what each instruction does, how it affects the flags and registers and how long the operation takes. It is vital to have this by you if you want to write the most efficient and fast running program that you can. You can discover, for instance, that PUSH HL looks just as efficient as LD D,H POP DE LD E,L but the second form will be executed much faster.

The one drawback you will find is that many of these books assume you understand hex. I said at the beginning that you have no need to use hex to work in machine code, and that remains true. But if you at least know what it means, and have a table or two to help you convert from hex to decimal, you can then use any machine code book or listing you may meet.

Next month, I am going to end this series by introducing you to the major alternative arithmetic conventions, binary (which you already use so we only need recap), hex and octal.

So if you get hold of any of the books I have listed, and they seem at the moment to be gibberish, worry not - all will be revealed.

See you next month.

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BASICally Speaking...

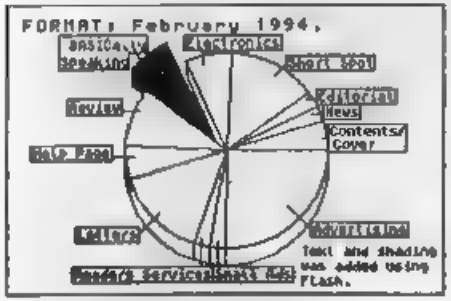
Part 5.

By:- David Finch.

Hi. Reading last months letters page, I was quite chuffed when I read the letter from J.Stewart. You see, it's nice to hear what people think of your work. If you, yes YOU, want me to cover any specific bit of Basic then please tell me (via the Format office). I'm a nice guy and I want to help...

Now, this month I would like to start a full program, instead of covering commands and methods. I will digress quite a lot to explain certain bits, so it will take a few months to do the whole program.

We are going to do the pie chart program suggested by John Wase in last months Short Spot (original program by Ben Booth). The idea is to draw a pie chart which has a bit of depth and 'pulled out sectors'. Like this:-



We will manage to cover some maths (yawn), program structure, graphics, and handling data (information, numbers). Both Spectrum and SAM owners will have a working program at the end (I wrote the program simultaneously on both machines). The programs are different because I want to show some of the good features of SAM Basic. Perhaps I will convince some Spectrum only programmers to get a SAM because of the excellent Basic. The main difference between the SAM and Spectrum programs is that I have used procedures with SAM. A procedure is an isolated part of the program which can be run by using its name like a command. For example:-

```
700 DEF PROC clr
710 PALETTE
720 LET xos=0:LET yos=0
730 BORDER 5
740 PAPER 7
750 PEN 0
760 CLS
770 PLOT 0,0
780 DRAW 255,0
790 DRAW 0,173
800 DRAW -255,0
810 DRAW 0,-173
820 END PROC
```

Once the above is in your SAM program, you can type clr like any other command and the above will run. DEF PROC marks the start, and is followed by the name (any any variables, see later). END PROC marks the end. The procedure will only run when it is asked to using its name, not by running after line 690 in the above example (try typing RUN, nothing will happen).

I hear lots of Speccy owners shouting "what about me!". Well, don't fret (would I let you down?). You just have to do a bit more thinking. The nearest thing is a GOSUB (available in all BasicS). In part

2 I told you about GOTO (remember?). GOSUB is identical, except when the program next meets a RETURN command it goes back to the GOSUB. There are limitations: You can't GOSUB within another GOSUB (you can call a procedure from inside another procedure), and also you can't associate variables with a GOSUB (still see later).

Since you can't call a GOSUB within another (which is what I will be doing with the above), we are going to use another method for the Spectrum. We will set a variable (z) before we GOTO the start, then GOTO z when it is finished. GOTO is supposed to be bad programming (causes bugs and other nasties), and GOSUB is supposed to be better. So, get into the habit of using GOSUB as much as possible (SAM, just use procedures).

Incidently, if you put all your GOSUB bits at the front of your program it should run a little faster, or so I am told.

So, if you are using a Speccy type in the procedure above, except change line 700 to:-

```
700 REM clr
```

Omit lines 710 and 720

Change 750 to:-

```
750 INK 0
```

Change the 173 and -173 in lines 790 and 810 to 175 and -175 respectively

Change 820 to:-

```
820 GOTO z
```

I suppose you would like me to explain that procedure.

710 SAM ONLY, resets all the colours to their proper values. More about this another time.

720 SAM ONLY; All the pixels (dots) on the screen are labelled by their x and y co-ordinate, like a graph. These commands set where the origin (zero position) is on screen, in this case, bottom left.

730 BORDER 5 sets the border round the screen to colour 5 (cyan, a light blue).

740 PAPER 7 sets the background to the screen to white.

750 PEN 0 or INK 0 sets the printing colour to black.

760 CLS clears the screen of any information and sets all the above values on screen.

770 PLOT tells the pen where to start drawing from, and puts a dot there to start with. It uses the co-ordinates like a graph.

780 DRAW moves the pen be the number of dots specified in the x and y direction, leaving a line behind it.

The procedure name, clr, is short for clear. It clears the screen to the required colours and draws a border round the edge

As promised earlier, I will tell you about attaching variables to a procedure (SAM ONLY). You can change line 700 to:-

```
700 DEF PROC clr b
```

and line 730 to

```
730 BORDER b
```

Now, when you call it, you must type a number after the name, which sets the border colour Try typing: -

```
clr 2
```

and it will clear with a red border. Speccy owners can get round this problem by simply LETting the variable b equal some number before you GOSUB or GOTO it. For the real program, leave this procedure as it was, without the variable.

I will talk about LOCAL (SAM) another time.

I'm sorry we haven't got much of the program done so far. It will speed up,

honest. Here's the rest of the program: -

```
10 DO
20 setup
30 inputdata
40 processdata
50 drawchart
60 IF fname$=" " THEN SAVE fn
   ame$ SCREEN$
70 LOOP
```

That's it. , (sort of). Since I am using procedures I can break the program into small bits which can each be written and debugged (tested and fixed) individually. I you just have to type in each procedure.

Setup: A procedure which asks the user a few questions about the chart that is to be drawn.

Inputdata: A procedure which allows the user to type in the numbers represented by the pie chart.

Processdata: A procedure which manipulates the raw information taken by inputdata and coverts it into information which can be used by drawchart.

Drawchart: The part which actually draws the thing.

Finally, if you entered a filename in setup then it will save the picture to disk (the above is for SAMs). Then it will totally restart (hence the loop).

If you have a Spectrum you will have to type in somethng totally different.-

Omit line 10

```
20 GOSUB 330: REM setup
30 GOSUB 60: REM inputdata
40 GOSUB 1010: REM Processdata
50 GOTO 830: REM drawchart
```

Line 60 see below

```
70 GOTO 20
```

Line 70 is equivalent to the DO LOOP used with SAM.

I have used GOSUBs instead of procedures, so you must state the line numbers. The REM bits are REMarks or REMinders. They do nothing except allow you to place notes in your Basic list. I have used them so that you know what you are GOSUBing to. You needn't type them in if you don't want (lazy bones). Everything in the line after a REM is ignored by the computer.

I have used GOTO for drawchart because I want to do a GOSUB within that part (and you can't GOSUB within a GOSUB).

LINE 60: If you are using tape then simply type `60 SAVE f$ SCREEN$` You must use f$ instead of fname$ because string names can only have one character on the Spectrum. This is annoying because it is easy to confuse them, of forget what they are. The SCREEN$ bit means you want to save what is on the screen and not the Basic program. If you are using a PLUS D or DISCiPLE then type the following:-

```
60 SAVE d1;f$ SCREEN$
```

You must remember to add the ; before the f$ or it wont work.

The next procedure that we are going to type in is the one which we are going to use to type in the information. I must state that there are easier ways of imputing information (using the straightforward INPUT command is one!). However, we're going to be adventurous and do our own procedure.

So we want to take information from the keyboard. For the SAM we have a command especially for this (by the way, I hope you are typing all this in.

SAM: `610 GET k$`

Spectrum:
```
610 LET k$=INKEY$: IF
    k$="" THEN GOTO 610
```

Both lines do the same thing; wait for a single keypress and store that letter or number as k$. However, for the Spectrum, LET k$=INKEY$ doesn't wait so you loop and check again if no key has

been pressed.

There is a problem; we want to input information with more than one letter or number. So we will call the final string that we produce n$. If we have a cursor (marker showing where you are typing to) over the text, you can type in a long string.

You may remember that I said a string is like Scrabble pieces on a rack. Now imagine that each piece is numbered from the left (the first being number one). You can identify any part of that string using its number. For example, a$="a string". Therefore the third Scrabble piece is s. This is done in Basic using a$(3) where the number in the brackets is the number of the Scrabble piece. So, if our string is n$, and our cursor is on piece number c (c is the variable that we'll use for the cursor), then the letter under the cursor is n$(c).

I want to use the procedure to type in the information in the main part of the screen (instead of at the bottom like with the normal INPUT). We'll have to PRINT what we are typing so that the user can see what has been entered. The problem with the PRINT that we have used so far is that it prints where the computer wants to put it, and not where the programmer wants to put it. You have to show it who is boss, and state exactly where you want it to print. So imagine every letter on your screen is in a square box. The left column of boxes is column number zero, and each consecutive box across is logically names column one, two etc (to 31, since there are 32 columns). Similarly for rows, with the top being zero.

```
590 PRINT AT y,x;n$
```

The above prints n$, starting AT line y,column x. x and y are variables that we will use later, it is possible to use numbers instead if you wish.

However, I want to print it so that paper is ink and ink is paper (the colours swaped). The reason will become apparent. I do this using the INVERSE command.

I could type 585 INVERSE 1 (which switches inverse on), then switch it off again when I've finished using INVERSE 0 as a command. This would switch inverse printing on permanently between the two commands being executed. If I want to just inverse for a single PRINT, I can do it in the same command. Change line 590 to:-

```
590 PRINT INVERSE 1; AT y,x;n$
```

Remember, the semi colon separates bits in print lines. This line will only switch inverse on while it prints n$ (because the INVERSE is inside the PRINT command). Afterwards it will be whatever it was before the line (on or off).

Now, here comes the tricky bit. We need to print the cursor so that the user knows where he/she is typing. It would be useful to have it in a different colour You already know everything that you need to know to do this.-

```
600 PRINT INVERSE 1; PEN 2; AT
    y,x+c-1;n$(c): REM (Spectru
    m, change PEN to INK)
```

This line only prints the letter which is under the cursor, and prints it in red so that it stands out.

I will now give you the commands to make this bit work, but it is NOT yet the finished procedure.

```
560 DIM n$(z)
```

where z is a variable that says how many Scrabble pieces we can have on the rack. DIM makes the rack and fills it with blank pieces. We now have n$ empty, ready to take in our information.


```
570 LET c=1
580 DO
```

Spectrum users omit line 580.

590, 600, 610 see above.

```
620 LET n$(c)=k$
630 LET c=c+(c<>z)
```

SAM only; `670 LOOP`
Spectrum only; `670 GOTO 590`

This allows you type in characters. You can try it;

Type (without any line numbers, so that you don't add to the program):-

```
LET x=1: LET y=1: LET z=20: GOTO
[illegible]
```

I would like to explain line 630. We have a condition there that may not make sence. If you remember, when we had variables representing decisions (eg hot=temperature>25). What was actually happening was that hot is made to equal 1 if the condition is true, and zero if it is false. Then when we said IF hot etc. the computer was testing whether hot is 1 or 0 (true or false). I have written LET c=c+(c<>z). z is the number of letters allowed, so when c (the cursor) is equal to z you don't want to add any more to the cursor. The (c<>z) becomes 0 when c=z, and 1 at all other times. So we add one to the cursor when we type a letter, except when we are at the end.

We will finish this procedure next month. DON'T FORGET TO SAVE EVEYTHING!

"You still look out of focus! Are you sure you haven't been drinking?"

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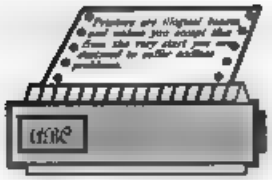

PRINTERS What Are They?

By:- Phillip Jenner.

Now that the expense of Christmas is over you may be thinking of splashing out on a new printer. You can spend from £100 to a small fortune - so which would be right for you? This short series sets out to give you the details on which to base you selection, and I'm going to start at the very beginning (but not quite as far back as the Big Bang).

Pause For Thought.

Printers are illogical beasts, and unless you accept this from the very start you are destined to suffer endless problems.

The reasons behind their irrational behaviour are largely historical. Printers were first developed decades ago, when computers were the size of rooms and needed their own power station to keep them running. Of course, technology has moved on since then, but each successive generation has been hampered by an overriding need to remain compatible with its predecessor.

Customers may be bowled over by the quality of the typeface and the wide range of fonts built into a new *wonder printer*, but they will only bring out their cheque books if they can use the latest model working with all their existing hardware and software.

History Time.

The earliest printers were teleprinters, or teletypewriters as they were sometimes called. These were little more than electric typewriters, originally built to print telegraph and telex messages but adapted by early computer pioneers so they could be connected to computers - why invent the wheel when you can pinch it from someone else and save the time.

Teleprinters responded to an early version of what is now called the ASCII code (ASCII stands for American Standard Code for Information Interchange and is pronounced ASKEY as in the late-great Arthur). This is a code for converting the binary numbers used inside the computer into intelligible letters, numbers and punctuation marks. It is a seven-bit code, which means every binary number from 0000000 to 1111111 (the equivalent of 0 to 127 in decimal) is allocated an equivalent character. The capital letter 'F' for example, is allocated to the binary number 1000110 (or 70 in decimal). Any printer which understands the ASCII code system will print out a letter 'F' when it receives that particular binary number. It is now accepted almost universally throughout the computer world.

The teleprinter was slow and had lots of moving parts which made it expensive - not only to buy but to maintain. Most of you will have seen one of the old manual typewriters - full of levers and springs - well a teleprinter was far more complex and therefore far more prone to breakdown. Although you will still find a few around (I come across them at radio rallies) they are not worth buying.

Golf-Balls & Daisywheels

However, time passed, the teleprinter evolved, a golf-ball printer came along (oh how I remember watching the football results printing up on the old Grandstand Results Service - you could get mesmerised.

But the Golf-ball was expensive, the 'balls' which carried the type were precision made and getting the right part of the ball (and therefore the right letter) to hit the page was not easy. Their advantage was that you could change the golf-ball and thereby change the typeface. IBM made a fortune out of the Golf-ball typewriter but they never really took off as computer printers.

But then some bright individual came up with the daisywheel printer.

These can still be found in offices, even today. This still uses the basic principle of a typewriter, in that a metal block engraved with the character is hammered against an inked ribbon, pressing the ribbon against the paper to form a mark. The characters, however, are mounted on the ends of springy metal fingers which radiate from the central hub rather like the petals of a flower. The *daisy* is rotated by a motor at high speed so as to bring each character under the hammer when it is needed. Most manufacturers designed their daisywheel printers so that the daisywheels could easily be removed and replaced with one of a different font. A whole range of fonts were made available, providing numerous typefaces and even mathematical symbols or foreign alphabets.

Most electric typewritters now use daisywheel technology and as a result you can buy very versatile typewriters for just a little over £100 these days.

In more recent years high-density plastic has been used instead of metal which made daisywheels even cheaper.

Daisywheel printers are much more flexible than the traditional teleprinter, however, they are, generally, rather noisy, sounding as though a machine gun has gone off beside you. By today's standards they are also slow, only capable of speeds up to around 50 cps (characters per second). Still, if perfect letters are what you want - this is the printer that sets the standard in the sub-£500 price bracket

Dot Matrix Problems

At around the same time as the daisywheel printer appeared, manufacturers started looking at ways of producing a wider range of characters, and even bit-mapped graphics. The solution was to break the character area into a matrix of dots so that each character could be drawn by filling in the appropriate dots. Printers based on this principle are appropriately called, logically, *Dot Matrix* printers and use a column of tiny solenoids mounted in a 'print head' to fire pins at the ribbon, pressing it against the paper to form columns of dots.

The matrix is created by moving the print head along the paper for each adjacent column. Early printers used seven pins although nine pins has now become the accepted minimum. This generates the familiar computer printout typeface - readable, but not very attractive

One way of improving this is for the print head to make two passes at each line, moving infinitesimally up or down on the second pass so that the dots fill in the gaps. This is how a NLQ (which stands for Near Letter Quality) printer works. A better way is simply to mount

more pins on the print head, and the accepted number for the current generation of LQ (Letter Quality) printers these days is 24, although some go up to 48 or even 60

Dot matrix printers are capable of printing an almost infinite range of characters and effects, well beyond the simple alphanumeric character set specified by the ASCII code. Epson, the dominant manufacturer of dot matrix printers during the early years, therefore introduced two extensions to the ASCII code. The first was to add another 128 characters by turning it into an eight-bit code, which makes a lot of sense as computers deal with data eight bits at a time.

Epson decided to use these extra 128 codes to represent italic characters, but unfortunately IBM confused the issue by using the codes for a combination of foreign characters and graphic symbols on its first dot matrix printer, the Proprinter.

Many modern printers allow you to choose between the IBM or Epson character set by setting the appropriate switch. Both the Spectrum and Sam are happiest with an Epson compatible printer but some programs, like *The Secretary*, need the IBM character set in order to use the box-drawing characters it contains. It is therefore well worth making sure your new printer has switchable character sets

The second change that Epson made was to use the ASCII control code 27 (usually known as the *Escape* code or ESC) to indicate that the next few characters should be interpreted as an 'Escape Sequence' (controlling some aspect of the printer or changing the typeface in some way) rather than as printable characters. The sequence '27 45 1', for example (or the binary numbers so represented), would result in any characters following being underlined, despite the fact that 45 is the code that would normally generate a hyphen and the 1 not being a printable code at all.

The escape sequences used by Epson's dot matrix printers have become widely accepted, and indeed many printers from other manufacturers will respond correctly to most of the codes used by Epson's nine-pin range. Some can even be set to behave exactly like Epson's highly successful FX80 model. Epson calls its system ESC/P, which stands for *Epson's Standard Code for Printers*, a subject covered in an article last year in ***FORMAT***

Today's dot matrix printers are cheap, flexible and relatively fast, the fastest achieving up to 800 cps. Many now have colour options, although the quality of the print depends on the driving software more than anything.

However, dot matrix printers are still noisy and, by their nature, not capable of a truly even result. Remember that what may sound quiet in a shop will sound totally different at 11.30pm when everyone else is in bed...

Next time I want to look at more modern printers (laser and inkjet) and explain some of the costs involved with each type of printer. See you then.

"Put it somewhere he'll never look - like the garden shed or his DIY chest!"

The HELP PAGE

Edited By:- Ray Bray.

We start this month with a similar problem affecting both Spectrum and SAM. Cyril Parry is a Radio Amateur who is interested in Packet Radio. He is using a Spectrum +3 with a modem to try and receive Packet Radio transmissions. He finds that the amount of interference generated by the +3 on the 2 metre waveband makes operations almost impossible. He has tried various methods of screening, and the use of ferrite rings on the leads without any success. He asks if we or our readers can make any suggestions?

The second letter, from David North, states that his SAM seems to be causing a lot of VHF noise, particularly when there is a lot on the screen, which makes it impossible to use a FM radio in the same room. It is also picked up quite strongly by his brother's CB aerial at the other end of the house. He asks if there is any way of cutting out or reducing the interference?

This unfortunately is a common problem with Spectrum and SAM and I think it is probably caused by the TV modulator. As far as FM reception is concerned, if you live in an area where there is a good signal it causes no problem, in fact I can put a FM receiver on top of the computer and not pick up interference, but if I de-tune the receiver the interference is heard and is still very loud some 50 feet away. I notice that the interference is modulated at the mains frequency on VHF.

Frankly I don't know what you can do about it. In the dim distant past I was involved in the development of a large mainframe computer installation where security was paramount, and much time and money was spent in trying to suppress or screen electronic emissions, but with only limited success. Mike tells me that he has heard of this type of problem with the +3 being solved by placing the computer on a metal tray. In the case of Cyril Parry's problem on 2 metres, as he has already tried various forms of screening it is doubtful whether this simple solution will work. If there is a reader who has found a solution to this problem please write in and let us know.

John Foster wrote from Burton on Trent with two problems. The first concerned the fact that he is unable to produce anything other than 13 question marks plus garbage when he tries to send a large screen dump from his grey +2 Spectrum via the PLUS D to a Panasonic KX-P1123 24 pin printer. The other problem is that he wishes to buy a connector to allow him to connect a second peripheral to his +2 but can't locate a supplier. On the question of the screen dump, it would seem that the printer is not understanding the codes being sent by the PLUS D for the large screen dump. The codes being sent are (in decimal), 27, 75, n1, n2, d1, d2, d3, etc. The first two figures set normal density graphics, n1 & n2 is the two-byte form of the number of data bytes, and d1

etc are the data bytes. If the format of the code for single density graphics for your printer are the same, but one or both of the first two figures are different, then you can POKE @83, (1st figure) and POKE @84, (2nd figure) and all should be well. If the format is different then as far as I know nothing can be done. On the second query, there used to be a Y connector produced for the Spectrum, (I forget the name), and then later MGT produced the Two Face. However, I have seen neither of these advertised for several years. Does any reader know of a supplier?

I was pleased to receive a short note of thanks from Gordon Henderson for helping to cure the 'phantom 1' problem he had with printing from *The Secretary*. However, he pointed out that it took him a whole afternoon to sort out how to make the changes to the printer code. He therefore enclosed a step by step check list of how to make the amendments which he thought might be of use to others:-

1. Check that your working disc is NOT write protected.
2. Load the SECRETARY and at the first menu choose the "CHANGE PRINTER CONTROL CODES" option.
3. Press "C" to get the second set of codes and move the cursor to "IBM CHARACTERS". Press RETURN to select for change.
4. Enter the revised codes to suit your printer, pressing the RETURN key at each space and then a final RETURN to get rid of the blue cursor
5. Press "C" and then "Y" to save the revised codes (and "Y" to overwrite the existing file).

Thank you for that Gordon, it is easy to forget that some things which are obvious to us are not always so clear to others.

We recently had a query about the problem of changing the line spacing on the OUTWRITE word processor. Tony Mugford of Welwyn has sent an amendment to the BASIC program which allows the line spacing to be set in fractions of an inch. The amendment is written for his Panasonic KX P1123 24-pin printer so you might have to change line 10296 to suit the printer being used. First break into the BASIC program and find the Procedure "MENU" at line 10000. Then insert the following amendments:-

```
10165 PRINT "   0. CHANGE LINE S
      PACING"
10285 IF K$<>"0" THEN GOTO 10300
10286 CLS: PRINT TAB 6;"CHANGE L
      INE SPACING"'''1  for F1"'
      '"2  for F2"'''3  NO CHANG
      E"
10287 PRINT '''"Spacing for F1 is
       now 1/";.01*INT (100/(PEE
      K 76016)*360)'''"Spacing fo
      r F2 is now 1/";.01*INT (1
      00/(PEEK 76022)*360)
10288 LET Q8=PEEK 76016, Q82=PEE
      K 76022
10289 INPUT "SELECT 1, 2 or 3 ?
      ";QF: IF QF<>1 AND QF<>2 A
      ND QF<>3 THEN GOTO 10286
10290 CLS
10292 ON QF: GOTO 10294: GOTO 10
      295: GOTO 10310
10294 PRINT '"Spacing for F1 is
      now 1/";.01*INT (100/(PEEK
      76016)*360): INPUT "WHAT S
      PACING IN INCHES FOR F1? "
      ;Q8: LET Q8=Q8*360: GOTO 1
      0296
10295 PRINT '"Spacing for F2 is
      now 1/";.01*INT (100/(PEEK
       76022)*360): INPUT "WHAT
      SPACING IN INCHES FOR F2?
      ";Q82: LET Q82=Q82*360
10296 POKE 76013,32,27,43,Q8,255
      ,1,32,27,43,Q82,255,1
10297 CLS : PRINT "1 RETURN TO M
      ENU"'''"2 ANOTHER CHANGE"''
      "3 RETURN TO TEXT"
10298 INPUT "SELECT 1 OR 2  ";QX
10299 ON QX: GOTO 10010: GOTO 10
      286: END PROC
```


Now to our next problem. For personal reasons Kevin Gould has had to quit the ***FORMAT*** Help Team (sad to see you go Kevin) so for the time being please send any Spectrum questions not related to the +3 to me (Ray) at the address below. The problem is that we now need to find someone to take over answering questions related to the 48K/128K/+2 Spectrum and the PLUS D. If you would like to help out (totally unpaid I must point out) then drop me a line. If you can give a few details of the areas you feel you may be able to help out on I will be grateful. Even if you can't help on a regular basis but have a specialist knowledge I could refer the odd question to I would love to hear from you.

That is all for this month, except that I thought it might be useful to try out the following tail piece for short questions which we are unable to answer, but to which some reader might have the answer

ANSWERS WANTED.

Does anyone know how to highlight (by flashing or inversing), the search word within the array E$(15,32) of Specfile+?

Please keep sending your problems/ answers to the following addresses:-

Anything SAM or General Purpose (and, for now, anything Spectrum:-

Ray Bray (Format Help Page),
'Elmsleigh',
4, Tidworth Road,
Porton,
Salisbury,
Wiltshire, SP4 0NG.

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YOUR LETTERS

Dear Editor,

With reference to your reply regarding spreadsheets in the January issue of ***FORMAT***. The PC version of Lotus 123 has a crude database and word processor built in. I am enclosing a small list that I had typed into the *123* in a jumbled form and then sorted by the program by column 1 and column 2 to show that data can be sorted by characters or numbers.

Regarding pages, Bob, if you remember, the ***FORMAT*** used to have a smaller font and more number of lines per page before the DTP was introduced. Couldn't you use a smaller font again so that ***FORMAT*** can carry more data without increasing the pages?

I am happy to see that you are making efforts to revive programs which are out of circulation. I hope that you will continue to use your efforts to bring back software from companies like Betterbytes, ZX Guaranteed etc., My letters to these went un-answered. I am happy to say that Steve's Software sent me their PLUS D utilities even though they no longer advertise it.

Similarly, would you be kind enough to reprint the best programs from S&SC? I have not seen this magazine and am assuming that it used to carry programs. I am sure that there will be many readers who would appreciate this. Also, how about publishing passport size photos of the current superstars of the Spectrum scene like John Wase, Carol, yourself and others? I know that the photo blocks cost money, but we readers do like to see who are talking to us. The glossies used to do that all the time, even though they sometimes went overboard by splashing the pictures all over the pages like that of Andrew Hewson in SU!

Yours sincerely, P.A. Basheer.

It does appear from letters we have received that some of the more costly spreadsheet programs for MS/DOS do include simple sort options although from comments it looks like it is not that easy to use. However, Campion is by far the most advanced spreadsheet on SAM or Spectrum and at £25 to INDUG members it is value for money.

I think you will find we now get more on the average page than we did before. Proportional spacing to the printing gives more characters to the line as well as making text easier to read. I would have howls of protest from many readers if I tried to print any smaller.

As soon as I can clean up the artwork I will make back-issues of S&SC available to ***FORMAT*** readers. As for photos, we will see. ***Ed.***

Dear Editor,

I shall get straight to the point, I am on the scrounge. What I require is a similarly like minded mug to work long hours for free and run up a huge phone bill.

No seriously, over the next couple of months I shall be putting up a bulletin board on an old Atari 8-bit (My first

love). The philosophy behind the board is to support 8-bit computers from the Acorn to the ZX80. MS DOS land users will be welcome to log on and reminisce.

I purchased a Plus 2, VTX5000 and the Comms PD tape some time ago but I must admit that my knowledge of comms on the Spectrum is very limited. I have no idea what PD, in general, is available and which comms program would be most suitable. All I do know is that I will be able to provide colour VT52 emulation, in 40 and 64 columns, at 1200/75 baud for the VTX5000 users.

I would be very grateful for any advice and help at any level. If anyone would like to Co-Sysop a Sinclair area the offer is open. Maybe ***FORMAT*** would like an area? I can be reached, by voice, on; 081-960-1605. All the best.

Yours sincerely, Alan Gray.

I must express my ignorance of all comms related matters. Anyone out there interested in helping Alan? ***Ed.***

Dear Editor,

I am using the 'Page-Maker' program from the Artist II program disc but find that the screen code that produces the dump to paper does not give a good quality output.

Can the code be altered or change to say, the small grey dump from the Artist II program itself?

Yours sincerely, Peter Ryan.

It would take quite a bit of hacking to change the print routine. It may be possible but I would not like to try it. ***Ed.***

Dear Editor,

Thank you for printing my letter in the Jan '94 issue of ***FORMAT***.

I think we all appreciate the work you put in on behalf of all SAM users, and my thanks also go to those of you who responded to my request. It will help others, Bob, if you will please publish this letter. The HELP page dealing with *The Secretary* did not help with my problem concerning the printing of a "1" at the top left of every letter printed using *The Secretary* and a Brother M1109 printer.

My first offer of help came from Steve Somercotes who suggested removing the printer control code for 'Reset Printer'; it worked for Steve but not for me. My 2nd call came from Keith Holmes who found that removing "PT 31" from line 6027 got rid of the dreaded "1". It did. Then the 3rd call from John Hunter suggesting changing the printer control code for "IBM Characters" to 27 only. This also worked. John also added that changing the code for Italics ON and OFF to, respectively, 27 52 and 27 53 would get italics working which was not the case with the existing codes.

Furthermore, as recommended by John, I have changed the control codes of 'Orator' to 27 82 3 35 as used for the £ sign. It does mean that instead of using "£" in the text I have to use EDIT then CHR then 0 every time I want to add a "£" in the text for printing. Is there a better way?

Keep up the good work as always, Bob.

Yours sincerely, Dr E.J.Wilson.

Dear Editor,

My article in January's ***FORMAT*** was much improved by the inclusion of the actual special signs: the division symbol, the crossed out equals, and the upside-down shriek. I had written the article on the assumption that these were not available.

It would be useful to me, and to other potential contributors, to know just what typefaces and their fonts you have available with your new system.

There was a curious misprint in the 2nd column of the 1st page, in which my '35 produces £ became '35 produces œ'. As you see, I've had to reproduce the 'ligatured digraph' (as the Oxford Rules for Compositors ....calls it) by hand, as it is not in IBM#2 character set; in fact, it seems to be rather a rare beast. How did that happen?

Yours sincerely, Ettrick Thomson.

Me hand *slipped*. No, seriously, the œ came about because the original letter was typed in on a word processor that uses ASCII but was printed out on one that uses ANSI. Character 156 is the £ in ASCII but the œ in ANSI (the £ lies at position 163 in ANSI).

Many modern word processors on IBM type machines are now using ANSI because that gives all the main foreign characters in the space from 128 to 255. Not all fonts contain all the characters but here are just a few:- 134=† 135=‡ 137=‰ 140=Œ 153=™ 162=¢ 169=© 174=® 177=± 191=¿ 198=Æ 208=Ð 222=Þ. But in addition I have many font files made up just of special character symbols (often called wingdings in the IBM world) like ⌂☎☯✆♗♕☑☺ many Greek maths symbols, and lots more. In short, if it is used somewhere then we should be able to print it.

So, sorry for the little slip, but thank you for the article. ***Ed.***

Dear Editor,

I purchased DRiVER system hoping to incorporate pull down menus into my basic programs. But I can't work out how to do this.

Perhaps you will be publishing a programmers guide in ***FORMAT***? I'm sure there will be lots of SAM users eager to read it if you do.

Don't get me wrong, DRiVER is the best thing to happen to SAM so far but I would like to learn more.

Yours sincerely, G.Lampton.

I did hear that Steve Taylor (the author of DRiVER) is writing a programmers guide but that will be for machine code users. I don't think it will be possible to use Basic for that sort of thing. ***Ed.***

Dear Editor,

I read with much delight in our Scottish Daily Record that the Office of Fair Trading/Monopolies Commission is to start an 'investigation' into the price of software on console in general.

This was brought about by console owners complaining about the games being too dear. Great! About time Sega/Ninento and the other console publishers were brought down a few steps. Cartridge games are just a blatant rip off, and its mostly parents on low incomes who suffer due to their kids needing that new game to keep in with the 'in crowd'.

Put simply, the answer is just don't buy them! Stick to the computers.

Okay, before I finish, any idea where I can get a joy-stick splitter for SAM? I can't find any, anywhere. I should think that I need a reply for the above question, and so I should enclose a SAE but I cant. The poor excuse is, that I'm on the dole so can only scrape enough together to get a stamp, but only one.

Yours sincerely, Les Quinn.

An SAE would not have done you any good Les. If we replied to every letter there just would not be enough time to produce ***FORMAT***. I try to answer as many letters like your's as I can, either

here in the letters page or by sending them on to the Help Page.

As to the Joy-stick splitter, drop Blue Alpha a line and they will quote you for making one. ***Ed.***

Dear Editor,

Thank you for again including an advertisement in ***FORMAT***, and congratulations on deciding to organize another Gloucester show.

I am pleased that my shift pattern allows me to attend and request that you book me a table and consider repeating your kind offer of no charge for educational matters.

I am willing to accommodate another three persons in my car from the Droitwich/Worcester area and welcome any such request.

Yours sincerely, David Wornham.

Thanks David, you are the first to offer. Anyone interested should contact David on the number given in the Flexibase Software advert. ***Ed.***

Dear Editor,

Herewith, a cheque for renewal of my subscription. My first year (of many I hope) as a subscriber to ***FORMAT*** has seen a lot of changes for me not least of all because I got married, but also in terms of my computing hobby (I find the word hobby is less embarrassing than addiction).

The change in marital status has left me with less time to feed my compulsion, but I still find time to grab the odd hour here and there with my "machines".

In fact, when I started my 1st year as a subscriber I had only one machine; a Spectrum +2A (and I must say that - never having experienced any of the others - I've never found it to be as annoying as people tend to complain about), shortly after that I obtained a +3 - now that IS a little annoying because it won't operate my PLUS D in 128k mode - a common fault I understand.

I found the continual references in your magazine, and the last remaining Spectrum mags, to what I considered to be an expensive mistake (the SAM Coupé) rather irritating. I was curious to see what all the fuss was about - but there was no way I could afford the prices being quoted in your magazine, so I banished the thoughts with "I'm quite happy with my Spectrums".

Anyway, in August, following tip offs from ***FORMAT*** and PD Power (the fanzine published by Martyn Sherwood of Prism PD), I innocently wandered into a local branch of John Menzies, never realizing for one instant what a change it was to make to my life (and my bank balance). There, lurking sadly on a shelf was the most amazing sight I have ever come across, a 256K, tape only SAM Coupe! I looked at the price ticket, did a double take, did it really say only 20 quid.

Having confirmed with the bemused looking sales-person that this was the true cost, before you could say "Where's my cheque book?", I was rushing out of the shop with my prize under my arm. [I think they call that shop-lifting ***Ed.***]

To cut a long story short, having persuaded my ancient tape player to load up the contents of the cassette supplied and marvelled at the graphics, speed, colour, sound and the silly cartoon character (which quickly grew on me) I decided to start a project.

My project was to bring my VERY basic SAM up to full Spec (no pun intended), the idea was that as I could afford each bit, I'd improve it a little more. My objective was to get SAM fully usable as soon as possible and to build enhancements on that.

Jenny will doubtless remember my frequent phone calls chasing after the 256K memory upgrade and external drive interface. She probably doesn't remember me saying "this is taking so long I am beginning to feel like giving up - it's hard to stay keen on a machine you can't use". Her prophetic reply was "be patient, you'll soon get back into it when the parts arrive" - How true!

Well here I am some 10 months or so later, you already have my order with West Coast for a Two-up, 1Meg RAM and an Internal Drive (Phases 5,6 &7) plus an order to yourselves for a Parallel Printer Interface (Phase 8) and as soon as those arrive a cheque will be in the post for the final phase of my project, the second Disc Drive!

Needless to say, the duration of my project has thrown up lots of extra software that I will start to acquire, particularly since I have limited my project so far to hardware and 'serious' software - I gather there's some good games out there too!

Oh well, that's enough for now, thanks for all your hard work, I look forward to completing my project soon!

Yours sincerely, Matthew Gallagher.

Keep reading Matthew. There are lots of new things coming for SAM, enough to keep your project going for a long time (unless the new wife finds something to spend the money on....) ***Ed.***

Dear Editor,

In February's issue, there was a query from Jon Rose asking whether a GENIUS mouse could be connected to the SAM. Well it can, but, you will need to make your own lead (or get a grown up to help you!)

There are two ways to do it and I enclose drawings for the wiring. Apologies for the poor drawings, I'm a writer, not an artist!

Unfortunately, I don't own a Genius mouse to try it. I don't doubt the reliability of my contributors, but there may be a remote possibility it may not work.

This is just one example of the work of Alchemist Research.

Yours sincerely, Andy Davis,
Alchemist Research.

Well, I studied you drawings Andy, but they could never work. You obviously do not understand the working of either a mouse or the SAM.

Yes, a special mouse could be connected to SAM's joy-stick port (The old JoyMouse from Blue Alpha did it that way) but that requires special mods to the mouse. The only way to get a mouse to work in SAM's mouse port is to buy a SAM mouse which comes complete with the electronics in it's little interface. ***Ed.***

Dear Editor,

I am virtually a novice at being able to program my SAM 512K and my Spectrum 48K, what books (or discs compatible with SAM) would you recommend.

Yours sincerely, S.R.Bird.

There are only a few books left for the Spectrum now. To learn to program one of the best is '30 Hour Basic - Spectrum Edition' published by the National Extension College (NEC) ISBN 0 86082 396 6 and priced at about a tenner. Almost everything you learn on the Spectrum will be usable on SAM. ***Ed.***

Dear Editor,

I have been receiving ***FORMAT*** for six

months now and find it fairly entertaining, although at times it can be a little too dry and technical.

It is not that I am new to computers, having cut my teeth on early IBM 'punched card' machines around 1965. They were huge and resembled a telephone exchange with racks and racks of 'bread boards' which needed rewiring if you wanted to do anything different. Whole night shifts were required to do a list of tabulations.

How amazing my ZX81 seemed, as it did so much more, yet was so small in contrast. Those wonderful(!) games with original names like 'Gamestape I, II etc.' All the games seemed to consist of Alphabet letters, which didn't detract from the fun, nor did it when the screen blanked out when it was 'thinking' in some games.

The Spectrum came and almost went, well it has in so far as volume sales go. It is nice to know that there are folk out there like me, who refuse to part with an old and trusted friend and software library, built up over the years.

I would be very happy if you did produce a games mag, maybe you could at least produce a games article or so until the idea lifts off.

I still think home computers should be fun primarily, after all there are serious machines available for those with such interests.

Your sincerely, N.J.Mills

We have done many articles on games although I could always do with more. The only thing we have kept out of is games reviews but, as we are now the only Spectrum/SAM mag left (apart from the fanzines) there is room for a mag to review games. ***Ed.***

Letters may be edited or shortened to fit on these pages.

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